ITEM 144 FY91

CEL-DS13
May 31, 1989

PURCHASE DESCRIPTION

SIGNAL GENERATOR (10 to 18 GHz)

FSNTT-A

1.0 GENERAL DESCRIPTION This procurement requires a stable microwave signal generator capable of generating signals over the frequency range of 10 to 18 GHz with internal and external modulation capabilities.

2.0 CLASSIFICATION The equipment shall meet the requirements of MIL-T-28800( ), Type III, Class 5, Style E, Color R for Navy shipboard, submarine, and shore applications with the following modifications and exceptions:

a. The non-operating temperature requirement is limited to the range of -40°C to +70°C.

b. The relative humidity requirement is limited to 95% noncondensating.

c. The operating and non-operating altitude requirements are not invoked.

d. The Electromagnetic Interference requirements of MIL-T-28800 are limited to CE01, CE03, CS01, CS02 (0.05 to 100 MHz), CS06, RE01 (back panel search excluded), RE02 (14kHz to 1 GHz), and RS03.

e. The warm-up time is extended to one hour.

3.0 OPERATIONAL REQUIREMENTS The equipment shall be capable of generating signals within the parameters and accuracies specified herein.

3.1 Frequency Characteristics

3.1.1 Frequency Range: At least 10 to 18 GHz

3.1.2 Frequency Resolution: Minimum resolution at least 1 kHz; digital readout

3.1.3 Frequency Accuracy: Indicated frequency shall be within ±1 kHz plus the measured offset of the time base when measured on an external counter.

3.1.4 Frequency Stability (equal to or better than limits specified below)

3.1.4.1 Internal: Better than 1 part in 10^9/hour after one hour warm-up

3.1.4.2 External: Equal to external standard frequency stability

3.1.5 Residual FM (CW mode in 50 Hz to 15 kHz detection BW): Less than 1.0 kHz peak

3.1.6 Spectral Purity (equal to or better than limits specified below)

3.1.6.1 Harmonics: All harmonically related outputs shall be at least -55 dBc.

3.1.6.2 Non-harmonics/Spurious: At least -55 dBc at frequencies greater than 1 kHz from carrier
3.1.6.3 Phase Noise: At least -75 dBc/Hz at 10 kHz offset from carrier

3.2 Output Characteristics

3.2.1 Range: +10 to -110 dBm (minimum)

3.2.2 RF Output: Leveled output shall be at least +10 dBm

3.2.3 Accuracy: ±2.0 dB of the actual measured output level, +10 to -110 dBm

3.2.4 Display/Resolution: Digital display; minimum resolution of 0.1 dB

3.2.5 Flatness: ±1.0 dB measured at an output level of +10 dBm

3.2.6 Impedance/Connector: 50 ohms; type N female connector

3.2.6.1 VSWR: 2:1 maximum

3.2.7 Reverse Power Protection: The generator shall be capable of accepting the following signal levels at its output connector without resulting damage.

3.2.7.1 Average Power: 4 W
3.2.7.2 Peak Power: 3.5 kW peak for pulse widths of less than 1 microsecond

3.3 Modulation Characteristics

3.3.1 Pulse Modulation

3.3.1.1 Internal
3.3.1.1.1 Pulse Rate (PRF): At least 100 Hz to 50 kHz
3.3.1.1.2 Pulse Width (PW): 0.1 to 10.0 microseconds
3.3.1.1.3 Rise and Fall Times: Less than 50 nanoseconds
3.3.1.1.4 ON/OFF Ratio: Greater than 80 dB
3.3.1.1.5 Delay: At least 100 nanoseconds to 10 milliseconds; accuracy 20% of setting
3.3.1.1.5.1 Sync Pulse Output: TTL compatible; risetime less than 50 nanoseconds
3.3.1.1.5.2 Video Pulse Output: TTL compatible; width corresponds to PW control setting
3.3.1.2 External
3.3.1.2.1 Pulse Rate: At least 100 Hz to 50 kHz
3.3.1.2.2 Pulse Width: Greater than 0.1 microseconds

3.3.2 Amplitude Modulation (AM)

3.3.2.1 Internal AM (square wave)
3.3.2.1.1 Rate: At least 1 kHz
3.3.2.1.2 Depth: At least 0 to 70%
3.3.2.2 External AM

3.3.2.2.1 Rates: At least 10 Hz to 10 kHz
3.3.2.2.2 Depth: At least 0 to 70% **CHECK THIS FOR ACCURACY - 90%?**
3.3.2.2.3 Distortion: Less than 5% at 50% depth and 1kHz rate

3.3.3 Frequency Modulation (FM)

3.3.3.1 Internal FM
3.3.3.1.1 Rate: At least 100 Hz to 50 kHz
3.3.3.1.2 FM Deviation: At least 1 MHz peak locked or unlocked; unlock center frequency shift less than 50 MHz

3.3.3.2 External FM
3.3.3.2.1 Rates: At least 100 Hz to 50 kHz
3.3.3.2.2 FM Deviation: At least 1 MHz peak locked or unlocked; unlock center frequency shift less than 50 MHz

4.0 GENERAL REQUIREMENTS

4.1 Power Source: 115 or 230 Vac ±10%, single phase, 50, 60 or 400 Hz ±10%, 200 W maximum

4.2 Calibration Interval: The calibration interval shall be 12 months minimum. The equipment shall be within all accuracy requirements specified herein, with a 72% or greater confidence factor following a calibration interval of 12 months.

4.3 Dimensions: The total volume of the unit shall not exceed 1800 cubic in (29,500 cubic cm).

4.4 Weight: The overall weight of the unit shall not exceed 50 pounds (22.7 kg).

4.5 Remote Operation: The unit will be capable of remote operation via IEEE-488 bus interface. It shall operate as a talker or listener such that all functions except the power on/off switch are controllable and shall have as a minimum the following subset of GPIB commands: AH1, SH1, T6, L4, SR1, RL1, DC1, DT1.